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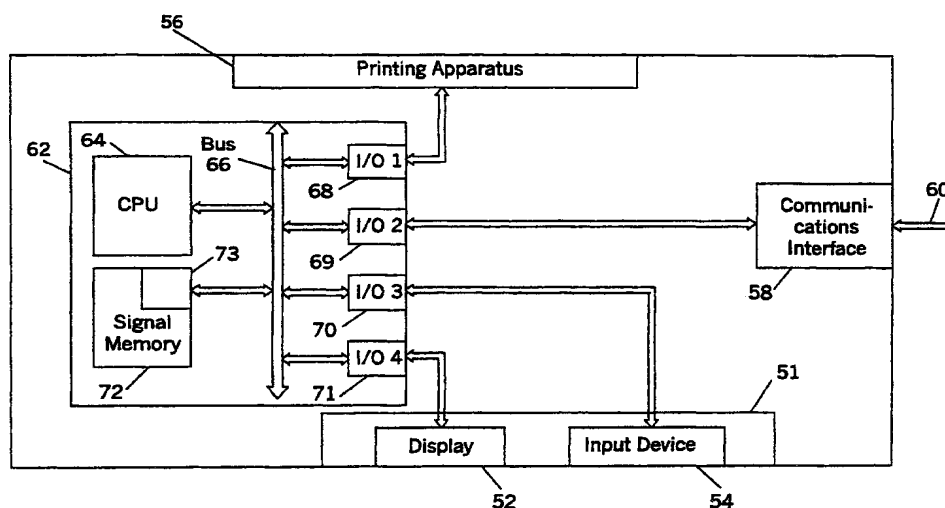
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(54) Title: A PRINTER AND METHOD FOR HOSTLESS PRINTING OF REMOTE DOCUMENTS



(57) Abstract: A printer (50) is provided for printing documents stored on a computer network. The printer is connected to the network and comprises a non-volatile memory. Included among the signals stored in the printer's memory are document signals representing a list of printable documents and their corresponding network addresses. Also stored in the printer's memory are program signals embodying the control algorithm which enables the printer to perform the functions described herein. The printer also comprises a user interface (51) for presenting information to a user and receiving command signals from a user. Upon receipt of a list signal from the user, the printer displays (52) the stored list of printable documents. Upon receipt of a selection signal from the user, the printer retrieves the selected document from its associated network address and prints it. The printer preferably allows a user to select a number of copies to be printed and may allow a user to input (54) the network address of a document to be retrieved and printed when the desired document is not included in the stored list.

## A PRINTER AND METHOD FOR HOSTLESS PRINTING OF REMOTE DOCUMENTS

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### BACKGROUND OF THE INVENTION

#### Technical Field

10 The present invention relates to the field of computer printers, and more particularly to computer printers for printing documents which are stored on a network.

#### Background Information

15 Prior to the development of computer networking technology and the proliferation of public and private computer networks, document distribution in large organizations was accomplished using a "print and distribute" method. Each time a document requiring widespread distribution was created or updated, copies would be printed for everyone and distributed throughout the organization. Such documents would include management memoranda, human  
20 resources information, forms needed by employees in filing healthcare claims, 401K change forms, etc. These types of documents would be printed and distributed each time they were updated and everyone in the organization would receive a copy regardless of whether they needed it at that particular time.

25 With the development of local area networks ("LANs"), wide area networks ("WANs") and other types of organization-wide computer systems, it became possible for documents to be distributed electronically. As important documents are created or updated, electronic copies are forwarded across the network to the personal computer ("PC") of each person in the organization. Each individual can then store an electronic copy of the document as a file on  
30 his or her PC and print it later as needed.

This method of distribution allows the creation of hard copies on an "as-needed" basis by each employee, thus minimizing the wasted paper of unwanted hard copy documents. It also makes the task of distributing new copies quicker

and simpler. On the other hand, widespread electronic distribution of  
35 documents creates a huge amount of network traffic and having each individual  
store the documents on their own PC takes up significant amounts of electronic  
storage space. Individuals could also fail to update the local copies and later  
print and use documents containing out of date information.

Over the last decade, the evolution of network protocols and the  
40 development of the internet into an omnipresent and dependable worldwide  
backbone has led to the re-structuring of most company-wide networks into  
“intranets”. These private networks utilize the structure and protocols of the  
internet but limit access to people within the organization. These intranets are  
typically connected to the internet to allow appropriate traffic in and out but are  
45 protected from unwanted intrusions by “firewalls” and other security measures.  
Therefore, individuals can reach the internet from their intranet-connected PCs  
to do research or send external e-mail but computers connected to the internet  
cannot access potentially sensitive company information stored on the intranet.

One advantage of the internet protocol is the addressability of individual  
50 computers connected to the internet and even of individual documents or  
“pages”, as they are referred to on the internet, stored on those computers. Each  
document can be assigned a Uniform Resource Locator (“URL”) which serves  
as its address. This addressability is also available on company intranets since  
they utilize the internet protocol.

Documents stored on the internet, or on a company intranet, may be  
55 navigated and viewed using one of the various “browser” programs available for  
the purpose. Two of the most popular browsers are Microsoft’s Internet  
Explorer® (“IE”) software and Netscape’s Navigator® software. By opening a  
browser on his or her PC and entering the correct URL a user can immediately  
60 download and view any document on any computer anywhere on the internet.

Another advantage of these company-wide networks is the capability to  
share peripheral devices such as printers. It is no longer necessary for each  
individual to have a printer connected to his or her PC in order to print  
documents. Instead, printers can be centrally located and connected to the

65 company's intranet, or even the internet. Since each device on the internet is individually addressable, communication protocols have been developed which allow any computer on the network to send a document to any network-connected and network-capable printer and have it printed.

These advances in technology have prompted the next step in the way  
70 large organizations distribute documents. Instead of electronically distributing documents to everyone in the organization, companies can simply store the documents on a server connected to the organization's intranet (or even on a computer housing the company's site on the internet if the documents are not sensitive) and publicize the documents' URLs instead. Then, users may access  
75 the documents whenever they wish using browser software on their PC.

This method requires the permanent storage of only one electronic copy of each document, ensuring that users always access the most up to date version. It also negates the need for repeated electronic distribution of the potentially large documents each time they are updated; representing a tremendous  
80 reduction in network traffic. However, to print a hard copy of such documents, a user still must open a browser program, download the document over the internet and/or intranet, view the document and then send it back over the network to the printer. This requires the document to be sent over the network twice, increasing network traffic, and requires the user's PC, and the user, to be  
85 tied up while downloading and viewing the document.

In order to avoid some of this network traffic, printer languages, such as Postscript 3 from Adobe, have recently been developed to allow "pull printing". Pull printing allows a user to send only the URL of a document to be printed to a network-capable printer. The printer then accesses the network and  
90 downloads, or "pulls", the document from the specified URL on the network and prints it. This avoids the need for the user to download the document and send it over the network to the printer, cutting the travels of the document in half. It also avoids the need for the user to open a browser and tie up his PC while the document is downloaded and then sent to the printer.

95 This function is useful for standard company documents and forms

where the user knows the appropriate URL and has no need to view the document before printing it. It can be implemented using a simple application program resident on the individual's PC which accepts from the user the URL of the document to be printed and forwards it to the printer in the format  
100 expected by the printer. Such an application could include an interface which would list documents by title instead of URL, storing the corresponding URLs behind the scenes, making it easier for users to find the needed documents. However, such a setup still requires that each individual have access to a PC with the appropriate interface application installed. The user must also have  
105 knowledge of how to utilize the application. Finally, some extra traffic over the network is still required as the URL must be sent from the PC to the printer.

#### SUMMARY OF THE INVENTION

110 Therefore, it is an object of the present invention to provide a printer for use with the internet or other computer network which is adapted to print documents stored electronically on the network in response to a user's input from the printer's front panel.

115 It is another object of the present invention to provide a printer having an internal non-volatile memory adapted to store the network addresses of various printable documents.

It is yet another object of the present invention to provide a printer which  
120 allows a user to select a document to be printed from a list of documents presented to the user.

It is still another object of the present invention to provide a printer comprising a user interface whereby a user may enter the network address of a  
125 document to be printed.

Accordingly, there is provided a printer adapted for connection to the internet or similar computer network. The printer comprises a non-volatile memory for electronically storing information, a central processing unit (CPU) for performing the functions described herein via stored software instructions, and a user interface for presenting information to a user and accepting input from the user.

The printer memory contains a list of printable documents which are stored on the network to which the printer is connected. Associated with each document in the list is the address of its location on the network and any special information the printer may need to print the document, such as special printer settings, etc.

In response to commands from the user interface, the printer presents the list of documents, in some menu format, to the user interface. Once a document is selected from the user interface, and a number of copies to print is similarly selected, the printer accesses the network at the appropriate address, downloads the document and prints the appropriate number of copies.

The user interface may also allow a user to enter the URL of a document which is stored on the network but which is not included in the document list in the printer's memory. The printer would then access the network at the input URL, download the document stored there and print it .

As will become apparent below, the present invention takes advantage of advancements in printer and communications protocols to address several concerns related to printing documents in a network-centric environment. The present invention allows documents stored on the network to be selected and printed directly from the printer - with no access to a PC or computer of any kind. Therefore, personnel within an organization who do not have regular access to a PC may still print company forms or documents from the network. This method of printing documents also only requires the document to traverse the network one time, minimizing the impact on network traffic

These and other objects, features, and advantages of the present invention will become more apparent in light of the following detailed

description of a best mode embodiment thereof, as illustrated in the accompanying drawings.

160

### BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which form a part of the specification, illustrate several alternate embodiments of the present invention. The drawings and description together serve to fully explain the invention. In the drawings, like  
165 reference numbers are used to designate the same or similar items throughout the several figures wherein:

Figure 1 is a figurative, perspective illustration of an embodiment of the printer of the present invention;

Figure 2 is a schematic block diagram of the printer in Figure 1;

170 Figure 3 is an exemplary illustration of the format of the document data stored in the printer's non-volatile memory;

Figure 4 is an illustration of an exemplary implementation of the user interface of the printer of the present invention;

Figure 5 is an illustration of the exemplary implementation of Figure 4  
175 where the user may enter a number of copies to print;

Figure 6 is an illustration of the exemplary implementation of Figure 5 where the user may enter the URL of a document to print;

Figure 7 is a diagram illustrating the steps performed by the printer of the present invention in providing user selected documents;

180 Figure 8 is an illustration of an alternate implementation of the user interface of the printer of the present invention;

Figure 9 is an illustration of the sequence of user inputs and displayed data associated with retrieving and printing a document from the printer of the present invention utilizing the user interface of Figure 8; and

185 Figure 10 is an exemplary illustration of a hierarchical structure used in storing and accessing the list of printable documents of the present invention.

### DETAILED DESCRIPTION OF THE INVENTION

190           Figure 1 illustrates a perspective front view of an embodiment of a printer according to the present invention. The printer, indicated generally at 50, includes a user interface 51 comprising a display 52 and an input device 54. The display 52 may be a cathode ray tube (CRT), a liquid crystal display (LCD), a light-emitting diode (LED) array or any other type of display known to those  
195 skilled in the art as being suitable for presenting text in a human-readable form. The input device 54 may be any known type of user responsive interface for entering user commands to the printer, such as a keyboard for direct entry of alphanumeric symbols, a set of arrow keys for providing user scan and selection of screen formatted icons or other indicia, a touchscreen or any other interface  
200 means allowing a user to input information and make selections in response to the information shown on the display 52.

          The printer 50 includes a known type of printing apparatus 56 to receive an electronic copy of a document in any number of formats and translate that electronic copy in a known manner into human-readable text on paper 57  
205 according to the formatting information contained within the electronic copy. This printing of text is accomplished using any one of a number of known technologies such as laser printing, bubble-jet, ink jet, dot matrix, etc.

          The printer 50 is also provided with a communications interface 58 which enables the printer to be connected to the internet or other computer  
210 network via the communications cable 60 in a known manner and thus share electronic signals with other computers similarly connected and enabled.

          Referring now to Figure 2, which is a schematic illustration of the printer 50 in which the prior illustrated elements of figure 1 are shown with their prior associated reference numerals. As shown, the printer 50 includes a signal  
215 processor 62. The signal processor 62 is of a known type, which includes a central processing unit (CPU) 64 connected through a bus 66 to a plurality of input/output (I/O) devices 68-71 and to a signal memory 72. The I/O devices 68-71 connect the signal processor to the printing apparatus 56, the communications interface 58, the input device 54 and the display 52,



220 respectively, and allow communications between such devices and the CPU.  
The signal memory 72 includes non-volatile memory for storing signals,  
including program signals which embody the control algorithm used in the  
present invention to direct the CPU 64 in performing the functions described  
herein. A portion 73 of the non-volatile memory of the signal memory 72 is  
225 mapped to receive and store signals representing a list of documents available  
for printing.

In operation according to the present invention, the mapped portion 73  
of the signal memory 72 stores document signals representing a list of printable  
documents stored on the network to which the printer is connected. This list is  
230 preferably in the form of a database with a data object associated with each  
document. Figure 3 illustrates an exemplary form of database containing N data  
objects called "Printer Bookmarks" (PBMs) representing N documents. Each  
PBM includes a document title 74(m) (m=1 to N), which will be displayed to  
the user for identification of the document, and the document's URL 76(m) or  
235 other type of address for locating the document on the network. Each PBM may  
also contain any necessary printer settings 78(m) unique to the document. The  
set of PBMs is created and updated by an organization's network or printing  
administrator on a PC or other type of network-connected computer and  
downloaded to the printer 50 over the network. The signal processor 62  
240 receives the PBMs via the communications interface 58 and stores the PBMs in  
the mapped portion 73 of the non-volatile memory of the signal memory 72.  
This download of information over a network and storage of the information  
into a local memory media may be accomplished by any method known by  
those skilled in the art to be appropriate for the purpose without departing from  
245 the scope of the present invention.

In response to a request command from the input device 54 (Figure 2),  
the CPU 64 accesses the mapped portion 73 of the signal memory 72, retrieves  
the document list stored there and presents the list to the display 52 in a human-  
readable format. In response to a selection command from the user through the  
250 input device 54 selecting one of the listed documents, the CPU 64 retrieves,

from the document list in the mapped portion 73 of the signal memory 72, the network address of the selected document. The CPU 64 utilizes the communications interface 58 to access the network at the retrieved network address, downloads the selected document and presents the document to the  
255 printing apparatus 56 to be printed.

The CPU 64 may temporarily store the downloaded document in signal memory 72 before presenting the document to the printing apparatus 56 for printing or, as technology and network bandwidth allow, the CPU 64 may “stream” the document directly to the printing apparatus 56. Any other  
260 techniques known to those skilled in the art for downloading and printing documents may be utilized without departing from the scope of the present invention.

In Figure 4, an embodiment 79A of the user interface 51 of the printer 50 of the present invention is shown with an exemplary implementation of the  
265 display 52 and the input device 54. In this implementation, the display 52 may be a simple four-line LED display 80. The input device 54 may be implemented as four (4) buttons; a “Document List” button 82, a “Scroll Up” button 84, a “Scroll Down” button 86 and a “Select” button 88.

Upon pressing the Document List button 82, a request command is sent  
270 to the CPU 64 whereupon the document titles associated with the first four documents in the document list stored in the mapped portion 73 of the signal memory 72 appear on the LED display 80. Pressing the Scroll Down 86 or Scroll Up 84 buttons causes the list to correspondingly scroll up or down in LED display 80, allowing the user to view the entire list of documents.  
275 Depressing the Select button 88 causes the selection command to be sent to the CPU 64 selecting the document then listed in the selection position of the LED display 80 - the position next to the Select button 88. Thus, by pressing the Scroll Up 84 or Scroll Down 86 buttons the user may position the desired document in the selection position and cause it to be retrieved and printed by  
280 depressing the Select button 88.

Figure 5 illustrates an alternate embodiment 79B of the user interface 51

of the printer 50 of the present invention which allows the user to enter a number of copies to be printed. In such an implementation, the CPU 64, after receiving the selection command from the input device 54 (here, the Select  
285 button 88), displays the prompt "Number of Copies?" in the display 52 (here, the LED display 80) with the default selection of "1" in the selection position. The user may then depress the Select button 88 to print one copy of the selected document or utilize the number keypad 90 to enter a different number of copies to be printed before pressing the Select button 88. In addition to the number of  
290 copies, a printer embodying the present invention may afford a user the opportunity to enter or select any of a number of other optional attributes associated with printing documents, such as paper size, image orientation, duplex printing, etc.

A further embodiment of the printer 50 of the present invention also  
295 allows a user to input the URL of a document to be retrieved and printed when the desired document is not included in the document list stored in the mapped portion 73 of the signal memory 72. Figure 6 illustrates yet another embodiment 79C of the user interface 51 of the printer 50 of the present invention. This implementation of the input device 54 includes an "Enter  
300 Document" button 92 and a keyboard 94. When the Enter Document button 92 is pressed, the CPU 64 responds to the resulting command signal by displaying the prompt "Enter document URL" on the LED display 80. The user may then utilize the keyboard 94 to enter a document URL in the selection position of the LED display 80 and press the Select button 88 to select the entered document  
305 for retrieval and printing. The printer 50 may again prompt the user for a number of copies to be printed as described above. The keyboard 94 may be a full keyboard of alphanumeric characters or may be any other type of input device designed to allow a user to input or select the characters necessary to represent typical network addresses.

310 As allowed by the implementation of the present invention, a document entered from the printer keyboard may be added to the document list stored in the mapped portion 73 of the signal memory 72. A printer of such an

embodiment may prompt the user for a document title to be added to the list along with the already-entered document URL. This would allow future users  
315 to select that document from the document list without having to know the document's URL.

Figure 7 illustrates the flow of the software routine 96 which is executed by the printer 50 in implementing the embodiment of the present invention illustrated in figure 6. This routine is necessarily one of many software routines  
320 resident in the printer 50 of the present invention and may be executed by the signal processor 62 from time to time in round-robin fashion with the other software routines. Alternatively, the software routine of the present invention may be entered on an interrupt basis when either of the Document List 82 or Enter Document 92 buttons is pressed.

325 By one method or another, control is passed to the software routine 96 at 98 and the software routine 96 checks 100 for the entry of either the Document List button 82 or the Enter Document button 92. If neither button has been pressed then the software routine 96 simply exits 102.

If one of the buttons has been pressed, the software routine 96 checks  
330 104 to see if the Document List button 82 was pressed. If the Document List button 82 has been pressed, the software routine 96 accesses 108 the mapped, non-volatile portion 73 of the signal memory 72, retrieves 110 the list of PBMs and presents 112 the list to the LED display 80 for viewing by the user. The software routine 96 waits 114 for the user to press the Select button 88.

335 Once the Select button 88 has been pressed, the software routine 96 accepts 116 the document title in the selection position of the LED display 80 and uses it as an index into the list of PBMs stored in the mapped, non-volatile portion 73 of the signal memory 72 to retrieve 118 the URL or other network address associated with the selected document title. The database indexing and  
340 retrieval functions described herein may be implemented using a hashing table, name sort or any other method known by those skilled in the art to be suitable for this application.

The software routine 96 then prompts 120 the user for the number of

copies to print and waits 122 for the user to press the Select button 88. When  
345 the Select button 88 has been pressed, the software routine accepts 124 the  
number in the selection position of the LED display 80. The software routine 96  
accesses 126 the network via the communications interface 58 and retrieves the  
document stored at the selected URL. The retrieval of the document from the  
specified URL may be accomplished using any method known by those skilled  
350 in the art to be suitable for the purpose. The steps of prompting the user for a  
number of copies and receiving the number may come before or after the step of  
retrieving the document from the network without departing from the scope of  
the present invention. Finally, the software routine 96 presents 128 the retrieved  
document to the printing apparatus 56 to print the requested number of copies  
355 and exits 102.

If the software routine 96 determines 104 that the user input was not the  
Document List button 82 then, by elimination, it must have been the Enter  
Document button 92. The software routine 96 prompts 132 the user for the  
document URL and waits 134 for the user to press the Select button 88. Once  
360 the Select button 88 has been pressed the software routine 96 accepts 136 the  
URL from the selection position of the LED display 80. The software routine  
96 then continues as described above to prompt 120 the user for a number of  
copies to print, accept the input number of copies 124, access 126 the network  
to retrieve the requested document, present 128 the document to the printing  
365 apparatus 56 to print the requested number of copies and exit 102. Again, the  
steps executed by the software routine 96 may be executed in any appropriate  
order and by any method known by those skilled in the art to be consistent with  
the scope of the present invention

Alternatively, the present invention may be implemented utilizing the  
370 front panel interface provided on a current Lexmark® printer product such as a  
Lexmark® Optra® S printer. This allows the present invention to be  
implemented without the expense and effort of designing and building an  
entirely new printer.

The pertinent parts of the front panel interface of a Lexmark® Optra® S

375 printer are shown in Figure 8 as an alternate embodiment 79D of the user  
interface 51 of the printer 50. In this implementation, the display 52 is a two (2)  
line by sixteen (16) character LCD status panel 140. The input device 54 is  
implemented as two (2) buttons; a "Menu" button 142 and a "Select" button  
144. The Menu button 142 is actually a rocker-type button with the left half  
380 covering the "Menu(-)" button 145 and the right half covering the "Menu(+)"  
button 146.

Current Lexmark® Optra® printers provide the user with a series of  
menus containing choices which allow the user to control the printer functions.  
The user may scroll through these various menus and menu choices by utilizing  
385 the Menu(-) 145 and Menu(+) 146 buttons. Choices presented in the bottom  
line of the LCD status panel 140 can be selected by pressing the Select button  
144.

Implementation of the present invention on a Lexmark® Optra® printer  
requires only that the list of printer book marks be made available to the user as  
390 a menu and that the control algorithm used to direct the printer's CPU be  
updated to include the functions described herein.

Figure 9 is an illustration of the user inputs and the information  
displayed on the LCD status panel 140 as a user selects a document to be  
printed. The LCD status panel 140(a) shows the printer is ready to receive  
395 commands. The user presses the Menu(+) button 146 to access the first menu.  
The name of the first menu appears on the LCD status panel 140(b) as Menu\_1 -  
Menu\_1 could represent any menu of printer functions. As that is not the menu  
the user desires to access, the user presses the Menu(+) button 146 again. The  
name of the second menu appears on the LCD status panel 140(c) and happens  
400 to be the Bookmarks menu the user wishes to access. The user presses the  
Select button 144. The title of the selected menu moves to the top line of the  
LCD status panel 140(d) and the first item in the Bookmarks menu,  
Document\_1, appears on the bottom line. Document\_1 is not the document the  
user wishes to print so the user presses the Menu(+) button 146 and the next  
405 document in the menu, Document\_2, is displayed on the LCD status panel

140(e).

Having found the desired document, the user presses the Select button 144 to select Document\_2 for printing. The selected document title moves to the top line of the LCD status panel 140(f) and the message "Copies = 1" appears in the bottom line. The user presses the Select button 144 to have the printer retrieve Document\_2 and print one (1) copy 148. If more than one copy is desired, the user may use the Menu(+) button 146 to adjust the displayed number of copies before pressing the Select button 144. If at any time the user desires to move backwards through the list of menus or menu choices or to reduce the displayed number of copies, the Menu(-) button 145 is used instead of the Menu(+) button 146.

In order to facilitate the retrieval of desired documents, the preferred embodiment of the present invention allows the printer bookmarks to be organized in a hierarchical series of folders. Figure 10 is an illustration of a sample set of printer bookmarks organized in such a hierarchical fashion. The Bookmarks block 150 represents the root node of the Bookmarks menu. Below the root node 150, the rectangular nodes; tax forms 152, healthcare forms 154, corporate information 156 and product lines 158, represent folders containing either sub-folders or individual documents. The oval nodes; 1040EZ 160, 1040 162, Schedule C 164, surgical form 166, hospitalization 168, job application 170, product\_1 172, product\_2 174 and company profile 176, represent individual documents which may be printed.

In order to retrieve a particular document, the user utilizes the Menu 142 and Select 144 buttons as described above to traverse the bookmarks menu structure. The folders appear to the user as sub-menus. The use of such a structure allows a user to locate the desired document without having to scroll through each individual document in the list. The documents illustrated here have been organized into folders by subject matter. Other criteria for sorting may be used without departing from the scope of the present invention.

An organization's administrator may also elect to make the document list stored on the printer of the present invention available to users remotely via

the network. In such a case, a user would utilize an application resident on their PC to emulate the interface available at the printer's front panel. All selections and printer actions would proceed as previously described with the user's  
440 selections and entries forwarded to the printer via the network.

Although the invention has been shown and described with respect to a best mode embodiment and alternate embodiments thereof, it should be understood by those skilled in the art that various changes, omissions, and additions may be made to the form and detail of the disclosed embodiment  
445 without departing from the spirit and scope of the invention, as recited in the following claims.



## CLAIMS

What is claimed is:

1. A printer, for use with a network of the type which provides signal communications between digital signal devices, including one or more network data base devices for storing therein the text of printable documents, each printable document having an identified network address, the printer  
5 comprising:  
  
apparatus for printing in response to printable documents presented thereto;  
  
10 a user interface for presenting information to a user and accepting input signals from a user; and  
  
a signal processor, having at least one non-volatile memory medium for storing signals, including document signals representing a list of identified  
15 printable documents stored on one or more of the network database devices, and including program signals for controlling the operation of said signal processor, said document signals including the network address of each listed printable document, said program signals commanding the signal processor in:  
  
20 determining the network address of a printable document in response to a signal from the user interface specifying the document;  
retrieving the printable document from the network address so determined; and  
presenting the retrieved document to said apparatus for printing.

25

2. The printer of claim 1 wherein the program signals further command the signal processor in;

receiving a number of copies signal from the user interface to  
specify the number of copies that should be printed of the retrieved  
5 document;

and

wherein presenting the retrieved document for printing includes  
specifying the number of copies to be printed.

10

3. The printer of claim 1 wherein determining the network address of the specified document comprises;

accepting a network address signal from the user interface  
identifying the network address of the document.

5

4. The printer of claim 3 wherein the program signals further command the signal processor in;

adding the accepted network address to the list of document  
signals stored in the at least one non-volatile memory medium.

5

5. The printer of claim 1 wherein determining the network address of the specified document comprises;

providing the document signals to the user interface for  
presentation to the user in response to a user list signal from the user  
5 interface;

receiving a document selection signal from the user interface to  
select a document from the list of identified printable documents; and  
accessing the stored document signals to obtain the network  
address of the selected document.

10

6. The printer of claim 5 wherein the document signals representing the identified printable documents are organized into a series of folders and sub-folders based on criteria meaningful to the intended user and presented to the user interface as such, whereby the selection by the user of a particular  
5 document is facilitated.

7. A method of printing, for use with a printer connected to a network of the type which provides signal communications between digital signal devices, including one or more network data base devices for storing therein the text of printable documents, each printable document having an identified network  
5 address, the printer having a non-volatile memory medium for storing a list of printable documents and a user interface for presenting information to a user and receiving signals from a user, the method comprising:

determining the network address of a printable document in  
10 response to a signal from the user interface specifying the document;  
retrieving the printable document from the network address so  
determined; and  
printing the retrieved document.

15

8. The method of claim 7 further comprising:

receiving a number of copies signal from the user interface to  
specify the number of copies that should be printed of the retrieved  
5 document;  
and

wherein printing the retrieved document includes printing the specified number of copies

10

9. The method of claim 6 wherein determining the network address of the specified document comprises:

accepting a network address signal from the user interface  
identifying the network address of the document.

5

10. The method of claim 9 further comprising:

adding the accepted network address to the list of document  
signals stored in the at least one non-volatile memory medium.

5

11. The method of claim 7 wherein determining the network address of the specified document comprises;

providing the document signals to the user interface for  
presentation to the user in response to a user list signal from the user  
interface;

5

receiving a document selection signal from the user interface to  
select a document from the list of identified printable documents; and  
accessing the stored document signals to obtain the network  
address of the selected document.

10

12. The method of claim 11 wherein the list of printable documents is organized into a series of folders and sub-folders based on criteria meaningful to the intended user and presented to the user interface as such, whereby the selection by the user of a particular document is facilitated.

5

13. A printer, for use with a network of the type which provides signal communications between digital signal devices, including one or more network computing devices which are responsive to user entered commands, and including one or more network data base devices for storing therein the text of  
5 printable documents, each printable document having an identified network address, the printer comprising:

apparatus for printing in response to printable documents presented thereto; and

10

a signal processor, having at least one non-volatile memory medium for storing signals, including document signals representing a list of identified printable documents stored on one or more of the network database devices, and including program signals for controlling the operation of said signal processor,  
15 said document signals including the network address of each listed printable document, said program signals causing the signal processor to perform the steps of;

determining the network address of a printable document in  
20 response to a signal from any one of the network computing devices;  
retrieving the printable document from the network address so determined; and  
presenting the retrieved document to said apparatus for printing.

14. The printer of claim 13 wherein the program signals further command the signal processor in;

receiving a number of copies signal from the network computing device specifying the number of copies that should be printed of the retrieved document;

and

wherein presenting the retrieved document for printing includes specifying the number of copies to be printed.

10

15. The printer of claim 13 wherein determining the network address of the specified document comprises;

accepting a network address signal from the network computing device identifying the network address of the document.

5

16. The printer of claim 15 wherein the program signals further command the signal processor in;

adding the accepted network address to the list of document signals stored in the at least one non-volatile memory medium.

5

17. The printer of claim 13 wherein determining the network address of the specified document comprises;

providing the document signals to the network computing device for presentation to the user in response to a user list signal from the network computing device;

5

receiving a document selection signal from the network computing device to select a document from the list of identified printable documents; and

accessing the stored document signals to obtain the network

10            address of the selected document.

18.        The printer of claim 17 wherein the document signals representing the  
identified printable documents are organized into a series of folders and sub-  
folders based on criteria meaningful to the intended user and presented to the  
user interface as such, whereby the selection by the user of a particular  
5        document is facilitated.

FIG. 1

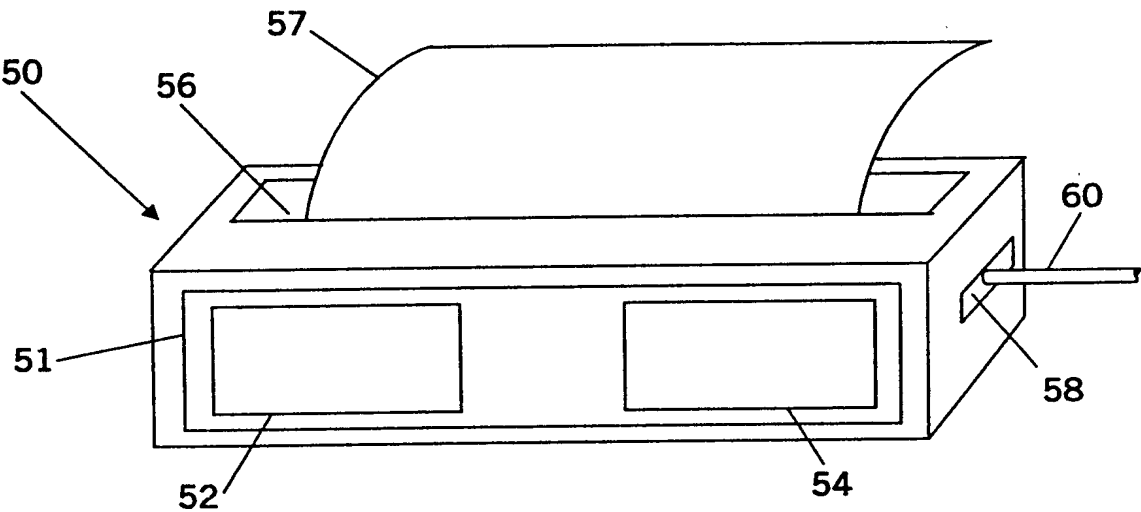


FIG. 8

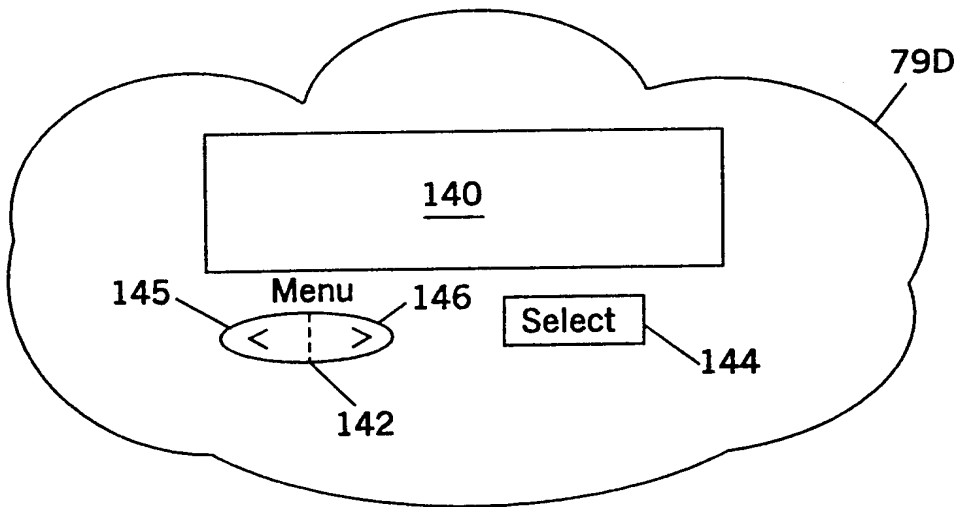




FIG. 2

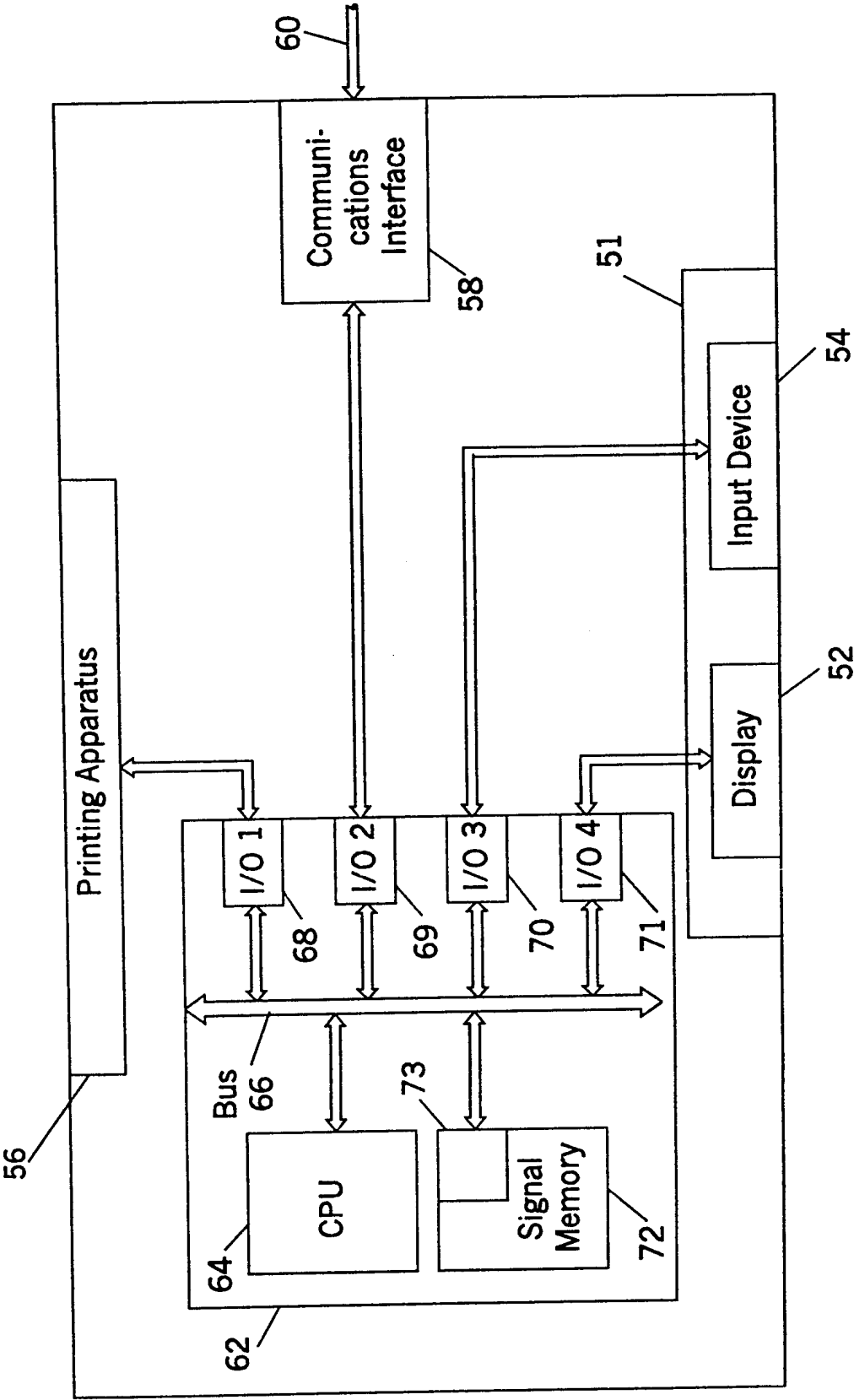


FIG. 3

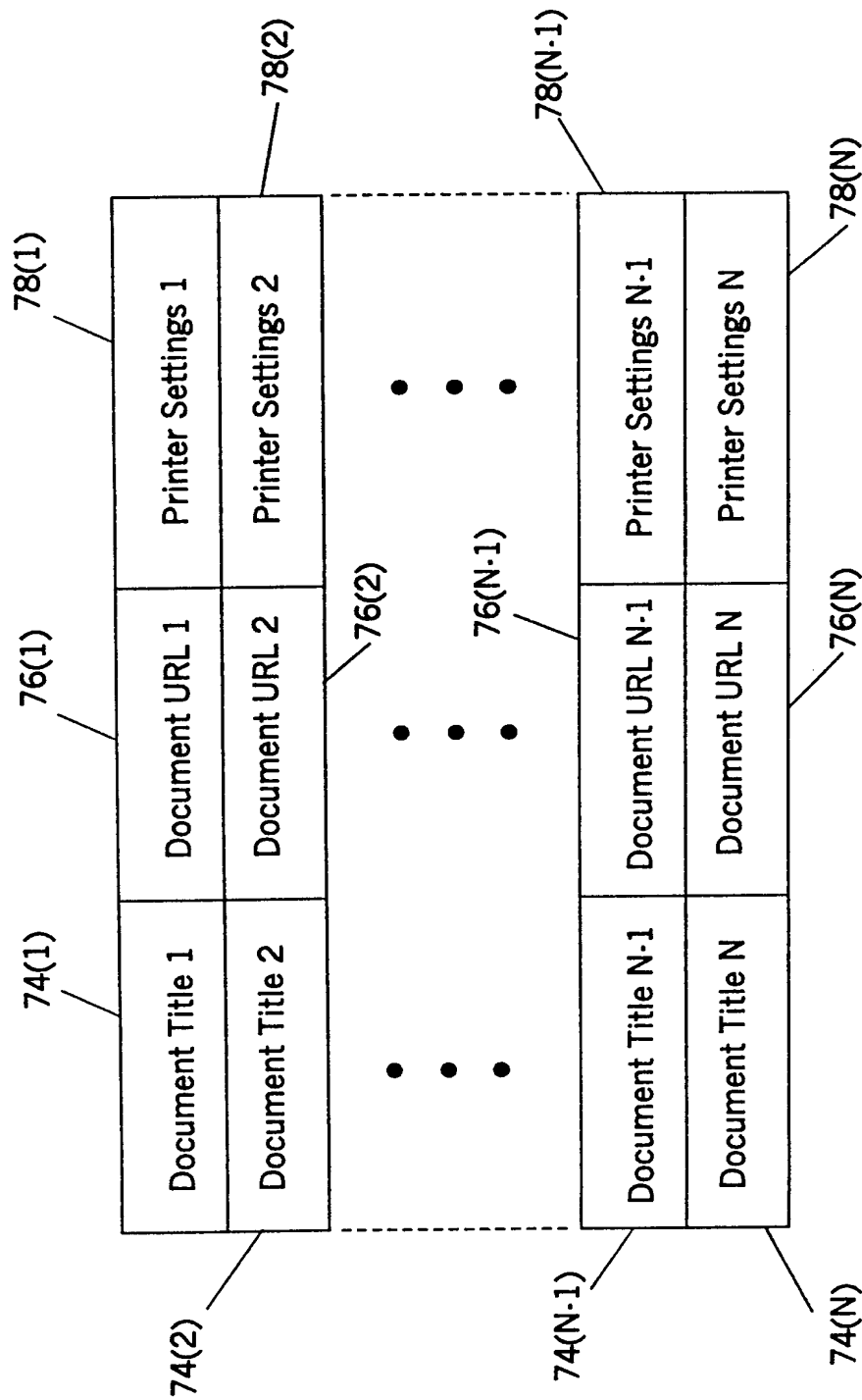


FIG. 4

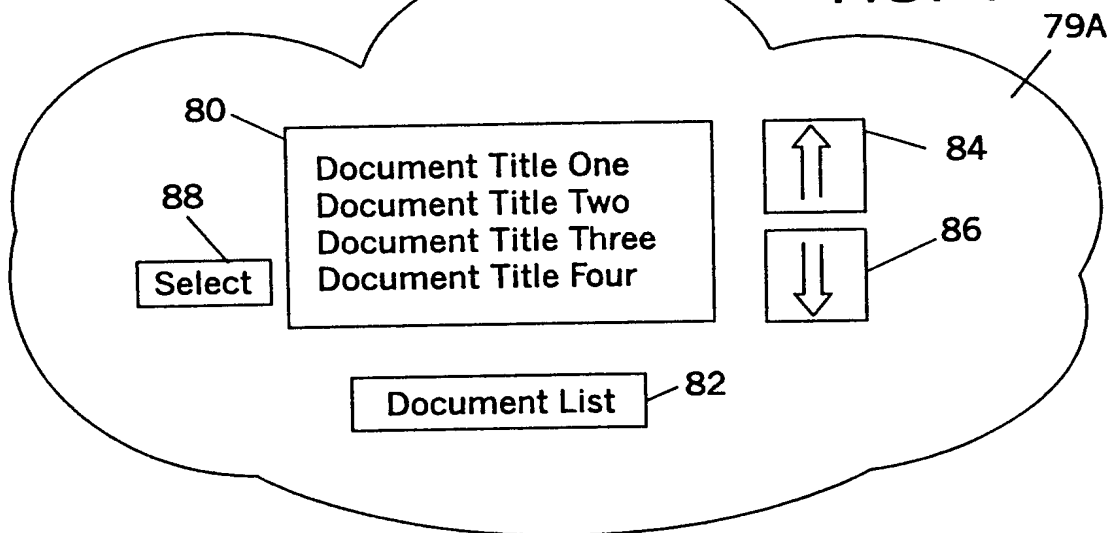


FIG. 5

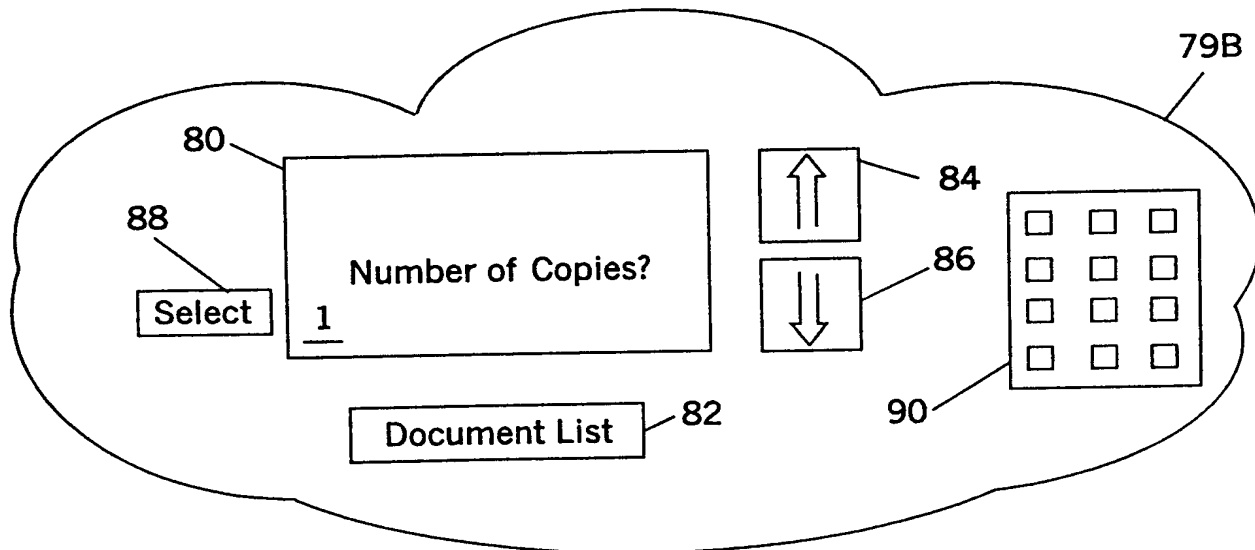
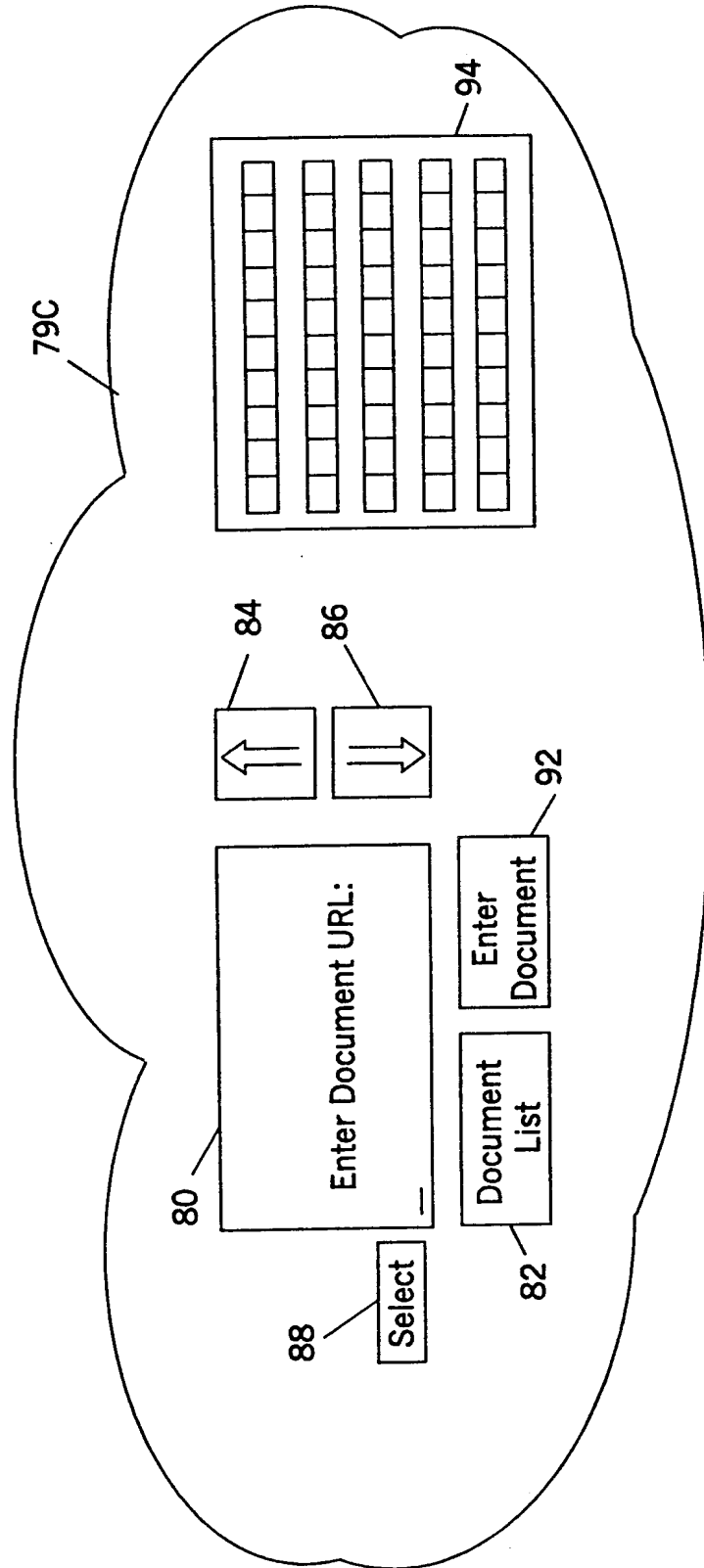
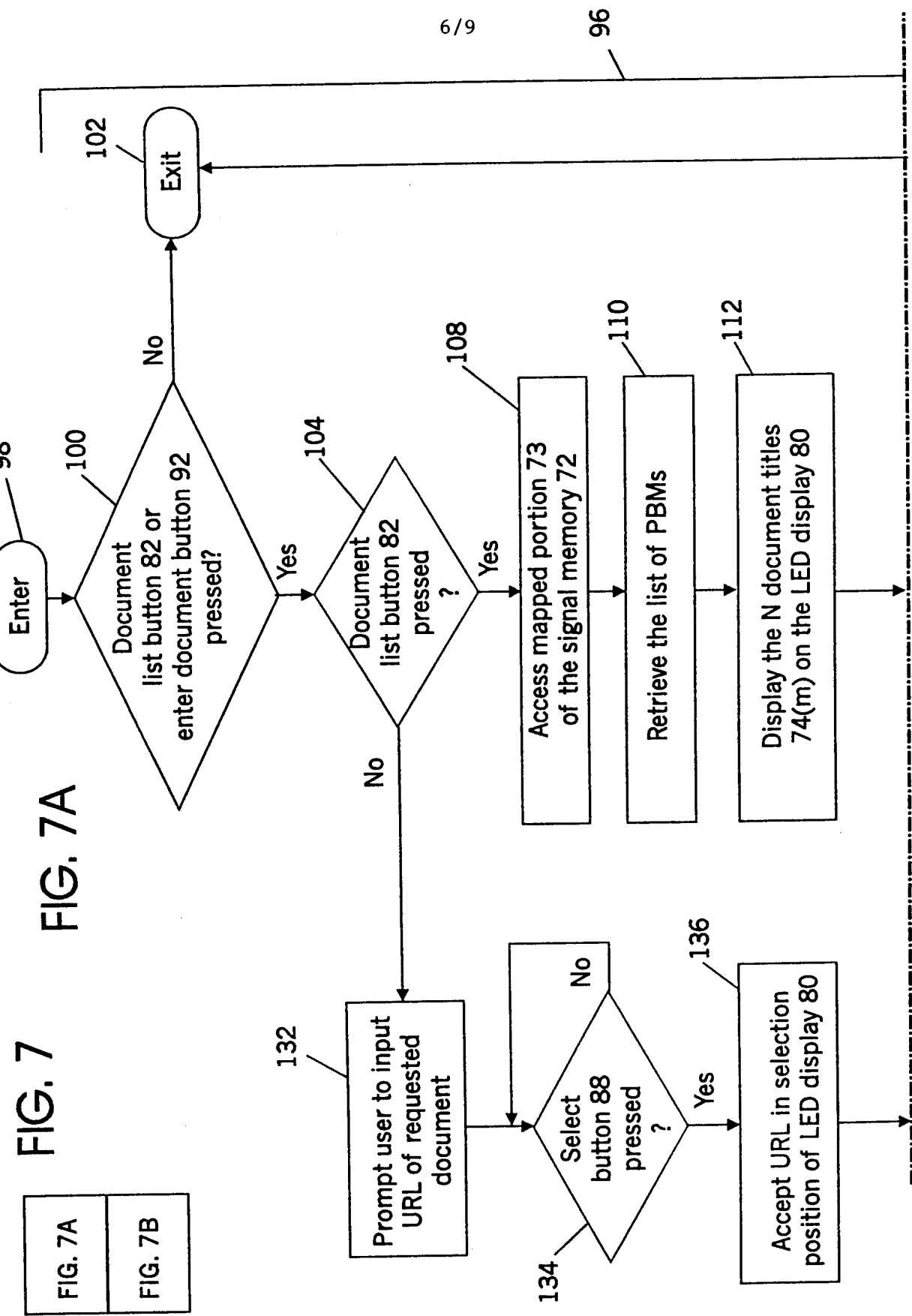


FIG. 6





96

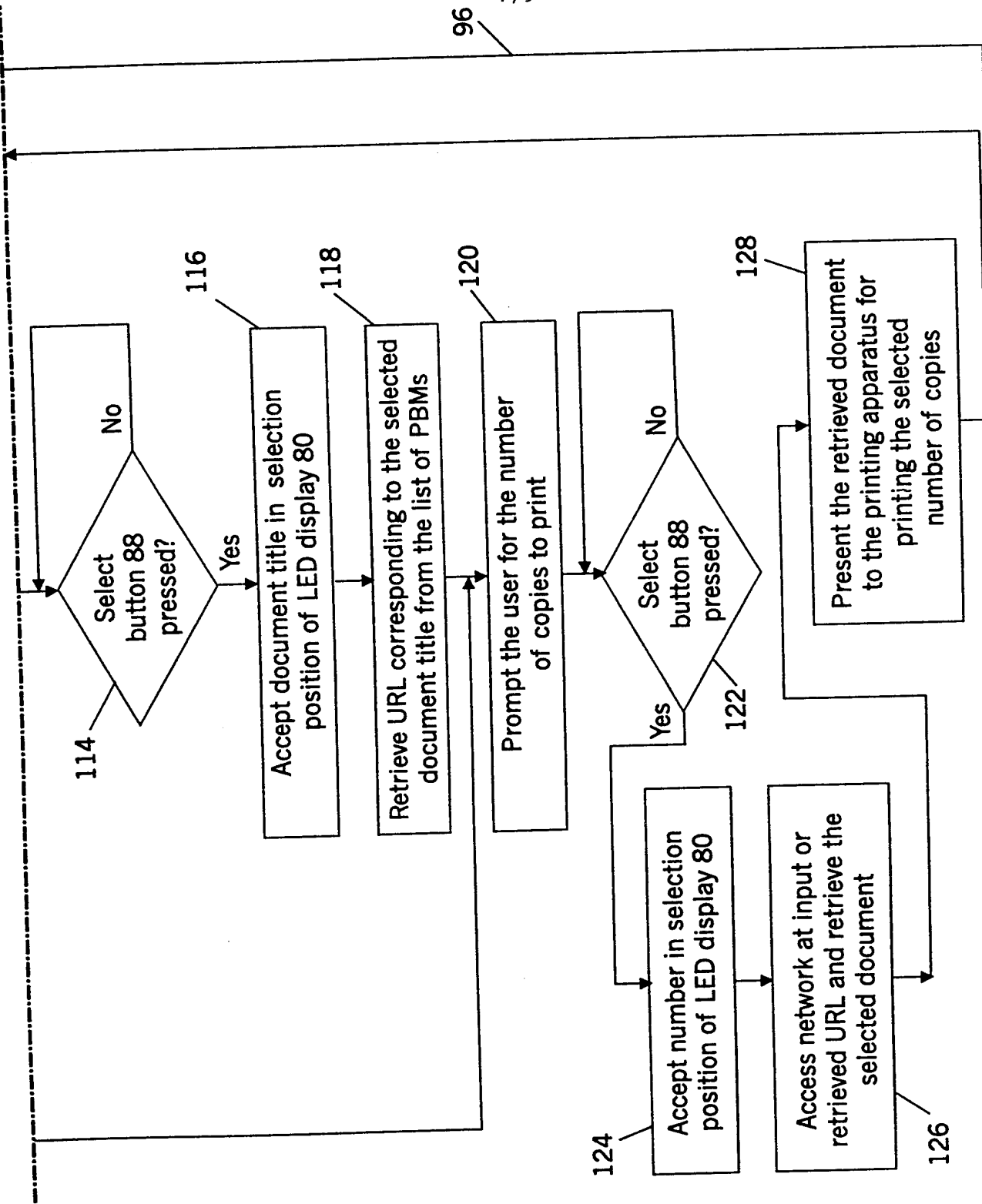


FIG. 7B

FIG. 9

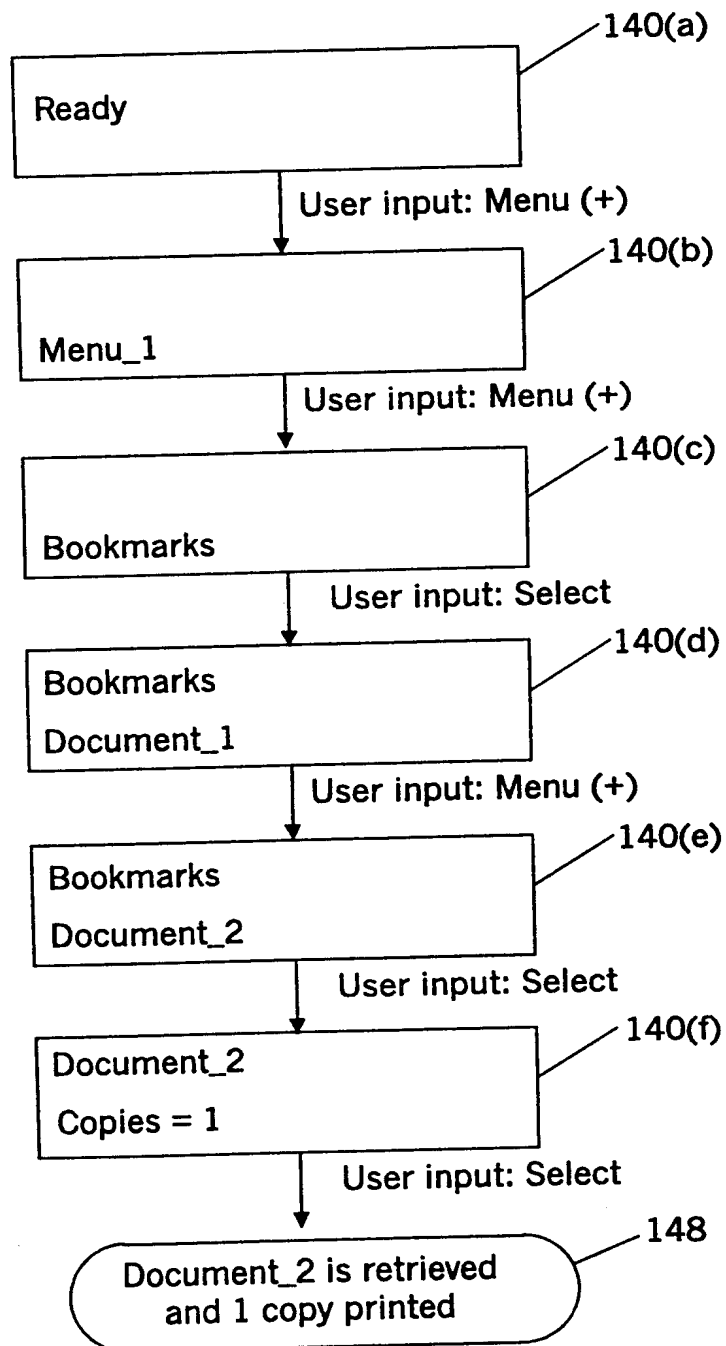
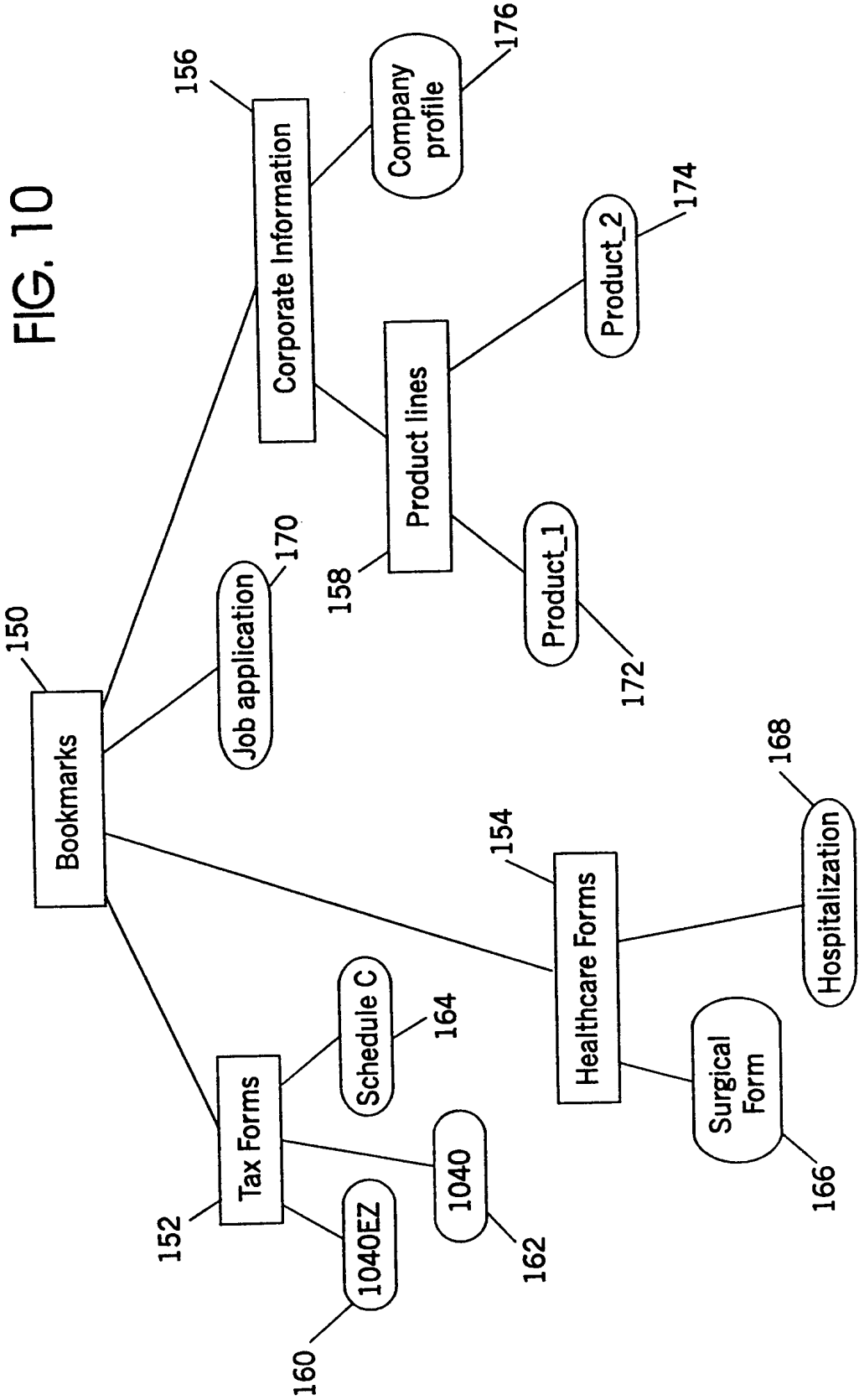


FIG. 10





# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US00/24577

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : GO6F 15/00

US CL : Please See Extra Sheet.

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 358/1.1, 1.9, 1.13, 1.15, 400, 500; 345/326, 329, 333, 335; 707/10, 100, 102; 709/200, 201, 213, 248, 249

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y,P	US 6,081,342 A (NAKAI et al.) 27 June 2000, whole document.	1-18
Y,P	US 6,058,373 A (BLINN et al.) 02 May 2000, whole document.	1-18
Y,P	US 6,044,372 A (ROTHFUS et al.) 28 March 2000, whole document.	1-18
Y,P	US 5,999,707 A (TANIGUCHI et al.) 07 December 1999, whole document.	1-18
Y	US 5,793,964 A (ROGERS et al.) 11 August 1998, whole document.	1-18
X	Observer, Pipeline's Internet Printing System Lets the printer Surf the Web, September 1996, whole document.	1-18

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
*A* document defining the general state of the art which is not considered to be of particular relevance	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
*E* earlier document published on or after the international filing date	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
*L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*Z* document member of the same patent family
*O* document referring to an oral disclosure, use, exhibition or other means	
*P* document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

04 DECEMBER 2000

Date of mailing of the international search report

**29 DEC 2000**

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# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US00/24677

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	Lexmark, Optra Forms User's Guide, Copyright 1998, whole document.	1-18

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US00/24677

## A. CLASSIFICATION OF SUBJECT MATTER:

US CL :

358/1.1, 1.9, 1.13, 1.15, 400, 500; 345/326, 329, 333, 335; 707/10, 100, 102; 709/200, 201, 213, 248, 249